being added to the daily report. This addition, by an arrangement with the telegraph company, can be made without increasing the expense of the report. At some of the corn and wheat region stations referred to a column is added to the bulletin giving the road conditions, but in some cases where this is not feasible a separate card bulletin is issued. At other stations the information is obtained from correspondents who are furnished with franked postal cards and make daily reports by mail, the information contained thereon being summarized at the central station, published on the daily bulletins, and otherwise distributed. The mail reports are supplemented by reports by telephone or telegraph, at Government expense, as occasions may require, on the occurrence of unusual conditions. The correspondents are largely persons connected with State highway commissions or interested in automobile traffic, and serve without compensation.

AERIAL WEATHER FORECAST SERVICE IMPROVED.

[Reprinted from Aerial Age Weekly, New York, Aug. 18, 1919, p. 1048.]

WASHINGTON, D. C.—The Weather Bureau * * * has prepared a map of the United States divided into 13 zones, for which forecasts are to be made for aviators and balloon pilots. These forecasts are made twice daily, at 9:30 a. m. and 9:30 p. m., and cover conditions for the succeeding 24 hours.

Since July 21, forecasts have been made with the country divided into seven zones, with such satisfactory results that the number of zones has been increased to 13.

The Air Service has sent out the revised map to their active stations throughout the country and the forecast will be forwarded at the time made,[1] it being intended that all cross-country fliers shall be advised of the weather conditions before starting on any contemplated flight, thereby reducing * * * to a minimum the liability of injury to aviators, balloon pilots, passengers, and property, as far as weather conditions are concerned.

[1] It is expected that arrangements soon will be made for the press services to handle these forecasts, for publication in newspapers located in the regions where flying is more or less general.

PLANT TEMPERATURES.

[From Annual Report of the Director of Bureau of Standards, year ending June 30, 1916, pp. 92–93.]

As a result of inquiries by botanists and agronomists concerning the transmission, reflection, and temperature of growing leaves and methods for determining the same, experiments were made on methods of making temperature measurements with needle-pointed thermocouples of fine (0.05 mm.) wires inserted into the ribs or petiole of a leaf. Data on transmission and reflection have been published in Scientific Paper No. 196, Diffuse Reflecting Power of Various Substances. The temperature measurements are relative values, which fluctuate very rapidly with every breeze that blows. In quiet air, in the shade, the thick succulent stem of a burdock leaf was 3.5° C. below the room temperature (below the temperature of the water in which it stood), while the leaf was only 0.5° C. below. Similarly leaves of other plants were 0.2 to 0.5° C. below the room temperature. In the sun, however, conditions were different. The cooling by transpiration of water is not rapid enough in comparison to the rate of absorption of solar energy. The temperature of a growing plantain leaf exposed to the sun was 5 to 6° C. higher than the air temperature.

PRECEPTS FOR FORECASTING RIVER STAGES ON THE CHATTAHOOCHEE AND FLINT RIVERS OF GEORGIA.

By C. F. VON HERRMANN, Meteorologist.

[Dated Weather Bureau, Atlanta, Ga., Aug. 8, 1919.]

GENERAL SUMMARY.

Preliminary investigation has shown that there does not seem to be a very definite correlation between the river stages at upper and lower river stations on the Chattahoochee and Flint Rivers, and that a scheme for forecasting flood stages could not be based on gage relations, at least without a very extended and time-consuming investigation. This probably results from the fact that the rains over the watershed of these two rivers frequently approach from the west or southwest, covering the lower courses first, and later advance to the upper watershed; although the reverse operation also takes place. In general, then, although the rise in the river may seem continuous at any point, the curve graphically representing the rise is in reality complex, resulting from the combination of two or more curves at different phases. Occasional use is made of gage relations in general, since the limit of a possible rise may be determined for each river gage by the crest stages at the upper stations, and especially between the two lower stations on the Flint-Albany and Bainbridge, and the two lower stations on the Chattahoochee-Eufaula and Alaga. This matter will, however, be made the subject of a separate investigation when time permits. In order, therefore, to complete a practical scheme for forecasting river stages another plan was followed, the principle of which may be described as follows:

It is evident that in every case and under all conditions the stage of a river must be a function of the rainfall over the watershed above the station. That is, for any station a factor may be found which will give the probable rise in the river in feet on the river gage corresponding to an average rainfall of 1 inch over the watershed. But this factor will necessarily be modified by many different causes, some of them of permanent character (which need not be considered) and others of fluctuating character which determine the various different rises due to nearly the same amount of precipitation. These fluctuating factors are, for example, the irregular distribution of rainfall, the rapidity of fall, the previous condition of the ground (or level of the ground waters), temperature conditions, initial stages, effect of water released from power dams, and many others.

The study required the untangling of these different factors in order that each might be given its proper value or weight in the rules for forecasting. Nevertheless the number of rules should be kept to the smallest possible minimum in order not to defeat the aim of the river forecast scheme, to enable the forecast official quickly to determine the probable stage of a river from telegraphed rainfall reports. A too minute dissection of rules would defeat this purpose.

The factor or rise in feet for each inch of precipitation will, of course, be different for each river station. Its value depends primarily on the nature of the bank at the station. If the possible range of the river is considerable, owing to its narrow channel with steep banks, the factor or rise per inch of rainfall is correspondingly large. For example, at West Point, Ga., on the Chattahoochee, the river rarely exceeds a stage of 20 feet, and the rise for an inch of rainfall during the winter-spring season when the rivers of Georgia undergo the greatest fluctuations is only 4.1 feet; on the other hand at Eufaula, where the river

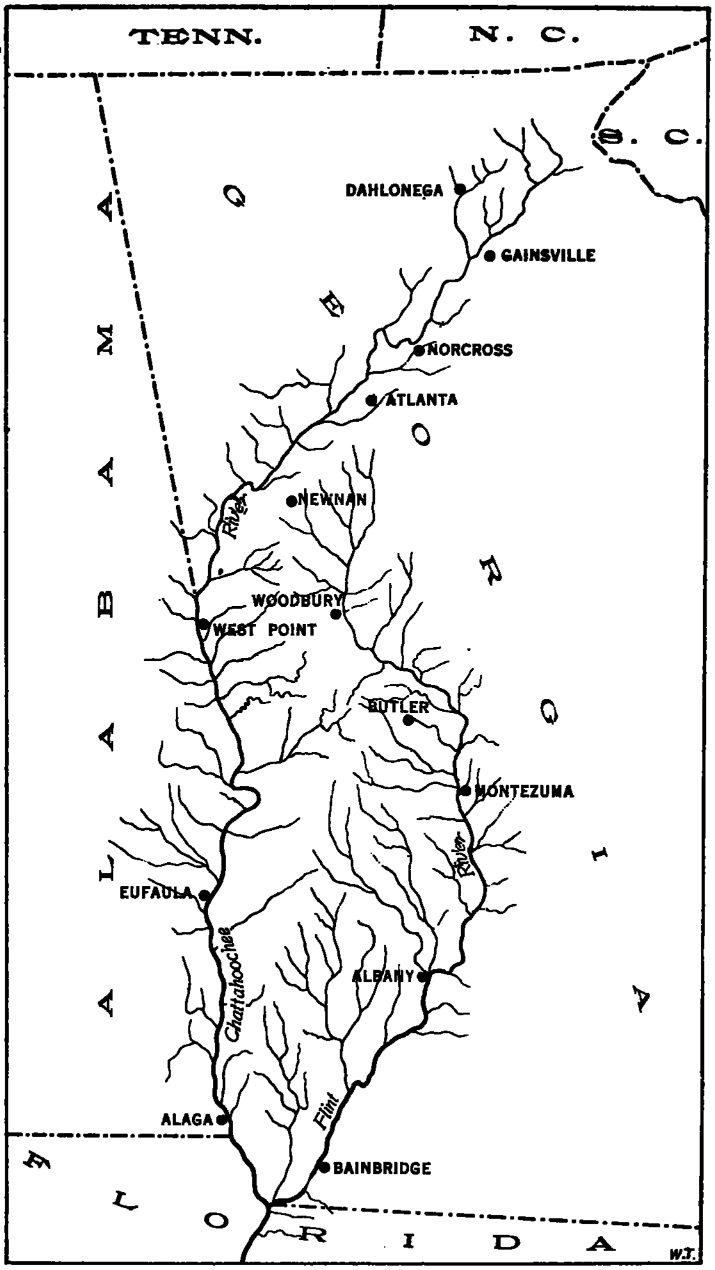

FIG. 1.

ranges as high as 50 feet or more, and often exceeds 40 feet, the rise per inch of rainfall is 10.4 feet.

The average winter-spring factors for the Chattahoochee and Flint Rivers are as follows:

CHATTAHOOCHEE RIVER.	Feet.	FLINT RIVER.	Feet.
Norcross	3.7	Woodbury	2.3
West Point	4.1	Montezuma	4.6
Eufaula, Ala.	10.4	Albany	4.7
Alaga, Ala.	7.1	Bainbridge	3.8

The summer-fall factors are much less and can not in most cases be accurately determined because of the paucity of high stages during the summer season. The diminution in the factor is no doubt due: (1) To higher temperatures which cause a rapid evaporation of the rainfall besides increasing the capacity of the air for water vapor; (2) the fact that the rainfall is locally distributed in the form of thundershowers, which rarely cover a great area; (3) the cultivated condition of the soil (a fluctuating factor that must be taken into account). There seems to be a sudden rise in the factor early in December in this section.

MODIFYING CONDITIONS.

Taking up the several fluctuating conditions that modify the several factors, it has been found that they cause an increase or diminution in the rate of rise in the river for different stations.

Rule 1. If the weather has been very dry for a month or more, or even for only a few weeks immediately preceding the rise in the river, the factor must be diminished, for the Chattahoochee River, on the average about 45 per cent, and for the Flint River about 25 per cent. This result has not been found to be modified at all by the prevailing temperatures.

Rule 2. General rains during the month immediately preceding the rise, or within even a week or two preceding, require that a marked increase be made in the factors used to compute the rise. This is obviously due to the saturated condition of the soil, or higher ground waters so that much of the rainfall enters the rivers which would otherwise be used to saturate the soil. This factor is distinctly modified by the temperature prevailing at the time. Cold as well as wet weather has a greater effect, while if the average temperature during the preceding wet weather is much above the normal the effect of the rainfall is almost nullified. The winter-spring factor must be increased on the average as much as 50 per cent for the Chattahoochee and 25 per cent for the Flint River. In some cases the effect is further increased by several months of wet weather preceding.

Rule 3. When the precipitation occurs in a relatively brief period of 24 to 36 hours, it enters the rivers more rapidly and the factor must be increased. The increase varies from about 25 per cent for the Chattahoochee to 15 per cent for the Flint. The percentage of increase, however, also varies according to the distribution of the rainfall in the upper, middle, or lower part of the watershed.

Rule 4. Heavy precipitation in the immediate vicinity of the station, in the lower or even in the middle watershed, increases the factor, often enormously, and the failure to predict flood stages in time will result from this cause oftener than from any other. The average increase required for the lower Chattahoochee River is 40 per cent, but on some occasions has required an increase of as much as 75 per cent. It is much less for the Flint River, averaging only 20 per cent.

Heavy rains in the lower or middle portion of the watershed cause a more rapid run-off and diminish the duration of the rise considerably.

Rule 5. On the other hand, if the heaviest rains fall in the upper watershed the factor must be moderately diminished, on the average about 15 per cent for both rivers. The duration of the rise is increased.

Rule 6. With high initial stages the factor must be rapidly diminished. This results of course from the spreading of the water over continually wider areas, and depends so much on the nature of the river bank at each station there is no uniformity in the percentage of decrease for different stations, but of course it approximates always the same for an individual station. Very heavy rains occurring after the rivers are much above flood stages usually merely lengthen the duration of the flood.

Rule 7. The influence of temperature conditions has already been noted in one or two cases. There seems to be no doubt that lower temperatures increase the effect of heavy rains and higher temperatures diminish it. On the other hand a change in temperature to decidedly colder *after* the rains have fallen, which is the usual course of events in winter and early spring, does not seem to have much effect on the subsequent rise of the rivers in this section, possibly because the Flint and Chattahoochee Valleys are located too far south and the water never freezes. The lower river stations are too near the Gulf.

Rule 8. The duration of the rise at each station varies considerably. The differences in the Chattahoochee and Flint Rivers, whose watersheds are practically in the same geographical region, are very remarkable. The Chattahoochee is a very flashy stream, and the forecaster will hardly have time enough to prepare his forecasts, while the rise of the Flint is gradual; often the crest of the rise has passed Alaga, the most southern station on the Chattahoochee, two or three days before the crest has reached Bainbridge, the most southern river station on the Flint River. On the average the Chattahoochee will require four to five days from the beginning of the rise to the crest stages, and the Flint 6 to 8 or 10 days. The duration is chiefly shortened by heavy rains in lower watershed, previous wet weather, and high initial stages, and is lengthened by heaviest rains occurring in the upper watershed and preceding dry weather.

Rule 9. The average rainfall from telegraphed reports should be computed for all stations from which telegraphic reports are usually received; that is, in making up the average rainfall on any occasion the dividing number should always be the same. Sometimes when the amounts telegraphed are very nearly the same from all stations it becomes more accurate to use the factors based on all rainfall reports received.

Rule 10. The average amount of precipitation required to cause flood stages in both the Flint and Chattahoochee Rivers in the winter-spring season is about 3.25 inches and in the summer-fall season is very much greater, unless, indeed, a long period of very rainy, cool weather has characterized the summer.

THE PROCESS OF ESTABLISHING THE RULES.

1. Since we are not primarily concerned with gage relations, the investigation is made for each river station separately.

The first step was to accumulate all river-gage records on sheets (Form 1078) to avoid constant reference to the river-record books, which would be very time consuming.

2. Tables were then prepared for each river station giving the highest and lowest and mean river stages for each month of the year from all available records, together with the number of times the stages were less than the monthly mean, and the number of times the river was above the flood stage.

3. An investigation of previous flood stages was made, what warnings had been issued, with description of each flood in detail.

4. An investigation was made of the gage relations at the several river stations for flood stages only.

5. For each river station tables were prepared giving:

(*a*) Date of each pronounced rise (usually any rise to a stage half way to the flood stage).

(*b*) The extent of the rise, i. e., initial low stage, highest stage, range, duration of the rise in days, and the mean change per day.

(*c*) Gage heights at upper stations and dates of same.

(*d*) Dates of the rains that caused the rise; amounts of rainfall over the watershed determined from all records of rainfall available, duration of the rains, and then the average factor or rise in feet in the river corresponding to each inch of rainfall.

(*e*) The average precipitation as determined only from the telegraphed reports of rainfall and the corresponding factor. This telegraphic factor will nearly always be higher than the previously mentioned factor.

These tables were recomputed at least three times, for at first it will be found that rains are included at the beginning or close of the several rises which subsequent investigation will show to have had no part in the rise. The average factors for the several months (the data all being arranged by months) were computed after the tables had been revised once, and were not afterwards changed, even though some factors were modified subsequently, provided they worked out well in the rules. Hence the factors used in the Table of Rules for Forecasting River Stages for each station do not always quite correspond with the means from the tables.

6. The mean initial stages, mean duration of the rises, and average daily changes, mean factors, etc., were then computed.

In Table 1 is given an example of the method of studying the relation of rainfall to rise in the rivers.

The rules are not established until every month for which records are available has been tabulated and studied in this way.

If a sufficient number of records is available, it will be found, for example, that in certain cases the rise is what may be called quite normal without complicating factors; in other cases the only modifying factor may be rainfall in the upper watershed; or preceding heavy rains only, or high initial stage, etc. It will be found not difficult gradually to untangle the effects and find a rule for each modifying factor which will be applicable to other cases where even a number of other factors exists at the same time.

Study the computation of the rises for West Point, February, 1917. These rises were computed by the rules which had been established for that river from all records up to but not including 1916, or 1917.

COMPUTATION OF THE RISES FROM THE TELEGRAPHED RAINFALL, WEST POINT, GA., FEBRUARY, 1917.

1. Rise of February 1–3, 1917:

Rains telegraphed Feb. 1:	Inches.
Dahlonega	1.89
Gainesville	1.70
Norcross	1.32
Atlanta up to 7 a. m.	.88
(Divisor 6=)Mean	.96

The modifying factor is that the rainfall was heaviest in the upper watershed, rule 5. The normal February factor which is 4.3 feet should therefore be diminished 25 per cent and becomes 3.2. Rise indicated on account of the average rainfall amounting to 0.96 is 0.96×3.2 or 3.1 feet. Initial stage 5.3, hence the crest stage indicated is 8.4 feet.

Crest stage actually reached 8.4 feet. (Error none.)

2. Rise of February 17–22, 1917:

	Inches.
Rains telegraphed Feb. 18:	
West Point	1.28
Atlanta up to 7 a. m	.80
(Divisor 6=)Mean	.35
Rains telegraphed Feb. 20:	
Dahlonega	1.51
Gainesville	2.05
Norcross	2.08
Atlanta up to 7 a. m	1.57
Newman	1.88
West Point	1.18
(Divisor 6=)Mean	1.71
Total	2.06

There are no modifying factors for this rise, which is a normal one. The mean February factor for West Point is 4.3 feet. Rise indicated with the total rainfall for the two days is 2.06×4.3 or 8.9 feet. Initial stage 4.5 feet. Crest indicated 13.4 feet.

Actual stage attained 13.5 feet. (Error −0.1 foot.)

3. Rise of February 24–26, 1917:

	Inches.
Rains telegraphed Feb. 24:	
Dahlonega	1.71
Gainesville	2.10
Norcross	1.30
Atlanta up to 7 a. m	.83
(Divisor 6=)Mean	1.01

In this case the modifying factors are:

(*a*) Heaviest rainfall in the upper watershed, rule 5, diminish the factor 25 per cent.

(*b*) Heavy rains and high stages just preceding, rule 2, increase the factor 60 per cent.

(*c*) High initial stages, rule 6, decrease the factor 20 per cent.

The normal February factor is 4.3 per cent; diminished 25 per cent becomes 3.2 feet, increased 60 per cent it becomes 5.1; and finally diminished 20 per cent it becomes 4.1.

Rise indicated 1.01×4.1 or 4.1 feet. Initial stage 8.6 feet. Crest indicated 12.7 feet.

Actual stage attained 12.6 feet. (Error +0.01.)

EXAMPLE OF A SET OF RULES FOR RIVER FORECASTING.

Forecasting river stages at Albany, Ga.—Telegraphic reports are available from Atlanta, Newnan, Woodbury, Butler, Montezuma, and Albany. Divisor always 6.

Rule 1. The normal rise in the Flint River at Albany Ga., at different seasons of the year is given in the following table:

Month.	Factor based on— All rainfall records.	Factor based on— Telegraphic reports only.
January	3.6	4.7
February	3.4	5.0
March	3.0	4.0
April	2.9	5.0
December	3.8	4.8
Winter-spring mean	3.3	4.7
Summer-fall mean	2.7	3.4

Rule 2. Flood stages do not occur at Albany with less than an average of 2.65 inches of precipitation over the watershed in winter, and 3.75 in summer.

Rule 3. The crest stage at Albany will normally be reached in 6 days from the beginning of the heavy rains or commencement of the rise, but this time may be diminished 2 days when the rainfall is heaviest in the lower watershed, or the initial stage is high.

Rule 4. For very dry weather during the preceding month or even during the few weeks just preceding the rise, the normal factor must be diminished 30 per cent.

Rule 5. If the preceding month or even only a few weeks have been very wet and cold, the factor should be increased 25 per cent, except that a preceding very wet period with *decidedly high temperatures* has no effect.

Rule 6. When the precipitation occurs practically in 24 to 36 hours with the bulk of it in the lower watershed (below Montezuma) increase the factor 30 per cent. If the bulk of the rain falls in the middle watershed increase the factor only 10 per cent.

Rule 7. When the heaviest precipitation falls in the lower watershed (Montezuma to Albany) then the factor giving the rise per inch of rainfall should be increased 11 per cent. When the heaviest rainfall is in the middle watershed increase the factor only 8 per cent.

Rule 8. When the rainfall is heaviest in the upper watershed, decrease the factor 15 per cent.

Rule 9. With high initial stages diminish the factor as follows: Initial stage above 10 feet diminish it 20 per cent; initial stage about 15 feet diminish it 25 per cent.

Rule 10. The following corrections applied to the stage at Montezuma two days before will indicate the approximate stage at Albany:

	Feet.
0 to 10 feet	−1.0
10 to 15 feet	+2.0
15 to 25 feet	+6.0

EXAMPLES SHOWING THE APPLICATION OF THE ABOVE RULES.

April 25 to May 4, 1908.—The river rose from 8.3 to 27.9 feet.

Date.	River stages (feet).	Rainfall telegraphed (mean).	Date.	River stages (feet).	Rainfall telegraphed (mean).
April 23		0.76	Apr. 29	18.5	
24			30	19.8	
25	8.3	1.14	May 1	23.5	
26	9.3		2	26.8	
27	11.0	2.82	3	[1] 27.9	
28	15.0				

[1] River remained above the flood stage until the 6th.

1. The rainfall of the 23d and 25th all occurred in the upper watershed.

Although April was quite wet it was also extremely warm, the mean temperature for Georgia exceeding the normal by 4.7°; hence no allowance is made for the wet month preceding, in accordance with rule 5.

The normal factor for April is 5; this should be diminished 15 per cent in accordance with rule 8 and becomes 4.2. Indicated rise with the rainfall of the 23d and 25th, 1.90 × 4.2 or 8 feet, which added to the initial stage 8.3 indicates a stage of 16.3 feet by the 29th.

2. The rainfall of the 27th was more general but somewhat heavier in the middle watershed, and the stage at the time the rainfall was telegraphed was 11 feet. Apply rule 9. The normal factor 5 should be diminished 20 per cent, and becomes 4. Indicated rise 2.82 × 4 or 11.3 feet. Computed crest 16.3 + 11.3 or 27.6 feet.

Actual stage attained 27.9. (Error − 0.3 feet.)

March 6 to 22, 1902.—The river rose from 10.9 to 26.2 feet.

Dates.	River stages.	Rainfall telegraphed. (mean).	Dates.	River stages.	Rainfall telegraphed (mean).
	Feet.			Feet.	
Mar. 4		0.28	Mar. 14	16.3	
6	10.9	.84	15	16.2	3.32
7	12.3		16	20.0	
8	13.3		17	22.5	
9	14.3		18	22.2	
10	14.5		19	21.7	
11	14.3		20	23.5	
12	14.9	.58	21	25.7	
13	15.8		22	26.2	

1. With the high initial stage of 10 feet reduce the normal factor for March, or 4, by 20 per cent when it becomes 3.2 (rule 9). Indicated rise with the rainfall of the 4th and 6th, 1.12×3.2, or 3.6 feet. Stage indicated by the 10th, or 6 days from the beginning of the rains, 10.9+3.6, or 14.5 feet. Actual stage reached 14.5 feet. (Error none.)

2. The rainfall of the 12th was heaviest near the station, and by rule 7 the factor should be increased 11 per cent and becomes 4.4 which by rule 9 should be diminished 20 per cent since the initial stage is above 10 feet and becomes 3.5. Indicated rise 0.58×3.5, or 2 feet. Stage 14.5 plus 2 feet or 16.5 is indicated by the 14th, or 1 day less than the normal time, because the rainfall was heaviest in the lower watershed. Actual stage reached 16.3 feet. (Error+0.2 feet.)

3. The rainfall of the 15th was heaviest in the upper watershed, but as the initial stage is already above 15 feet so that rule 9 applies, no allowance need be made, except that the crest stage will be delayed 2 days beyond the normal or to the 22d instead of the 20th. In this case the river had begun to fall on the 18th and 19th, when the flood from the upper course began to have its effect on the river at Albany.

Applying rule 9 and reducing the normal March factor 4, by 25 per cent, it becomes 3: rise indicated with the rainfall of the 15th, 3.32×3 or 10 feet. Initial stage (stage on the 15th) 16.2. Indicated crest 16.2+10 feet, or 26.2 feet. Stage actually attained 26.2 feet. (Error none.)

April 17–24, 1912.—The river rose from 6.1 to 30.2 feet.

Date.	River stages.	Rainfall telegraphed (mean).	Date.	River stages.	Rainfall telegraphed (mean).
	Feet.	*Inches.*		*Feet.*	*Inches.*
Apr. 16	....	0.44	Apr. 21	18.7	2.15
17	6.1	1.68	22	24.3	....
18	7.7	....	23	29.6	.80
19	10.8	....	24	[1] 30.2	....
20	13.0	....			

[1] Above the flood stage to the 30th.

1. The preceding month was very wet. Hence, by rule 5 the normal factor for April, which is 5, should be increased 25 per cent, and becomes 6.2 feet. Indicated rise with the rainfall of the 16th and 17th, 2.12×6.2, or 13.1 feet. Probable stage in 6 days, or on the 21st, 6.1+13.1, or 19.2 feet. Actual stage reached 18.7 (Error+0.5 feet.)

2. The rainfall of the 21st was heaviest near the station, hence, since March was excessively wet, the factor in addition to receiving the increment indicated by rule 5 as above, should also be increased 11 per cent in accordance with rule 7, and becomes 6.9. But since the initial stage is now above 10 feet, the factor should be diminished 20 per cent in accordance with rule 9, and becomes 5.5. Indicated rise with the rainfall of the 21st 2.15×5.5, or 11.8 feet, which, added to the actual stage attained on the 21st, gives a probable crest stage of 18.7+11.8, or 30.5 feet. The crest will be reached in 4 days (6−2) because the rainfall was heaviest near the station. Actual stage attained 30.2. (Error+0.3 feet.)

3. The rainfall of the 23d caused no further rise but served to maintain flood stages to the 30th.

March 13–21, 1913.—The river rose from 6.5 to 30.3 feet.

Dates.	River stages.	Rains telegraphed (mean).	Dates.	River stages.	Rains telegraphed (mean).
	Feet.	*Inches.*		*Feet.*	*Inches.*
Mar. 13	6.5	1.66	Mar. 18	26.3	....
14	8.0	1.28	19	28.1	....
15	13.0	2.25	20	30.0	....
16	21.1	.50	21	30.3	....
17	25.2	....			

1. February and March were very wet. Use the normal factor for March, which is 4, increased 25 per cent in accordance with rule 5, making it 5 feet. Indicated rise with the rainfall of the 13th and 14th 2.94×5, or 14.7 feet. Initial stage 6.5; stage indicated by the 17th, 21.2 feet.

2. But the heavy rains of the 14–15 (telegraphed morning of the 15th) rapidly entered the river, being heaviest in the vicinity of the station (Albany 4 inches). Applying rule 7, the March factor becomes 4.4, but as the stage was now above 10 feet, this is reduced to 3.5 by rule 9. Indicated rise with the rainfall of the 15th, 2.25×3.5, or 8.8 feet, which, added to the computed stage on the 21st, gives a probable stage about the 20th of 30 feet. (Error none.)

3. The small amount of the precipitation telegraphed on the 15th, when the stage was above 20 feet, would not have justified predicting higher stages, as at stages above the flood stage, which is 20 feet, the factor at once diminishes enormously, at Albany at least 80 per cent. So that the only further rise that could have been expected would have been 0.50×0.8, or 0.4 foot, to a crest of 30.4 feet. Actual stage reached 30.3. (Error+0.1 feet.)

These few examples will serve to indicate the practical application of the rules.

TABLE 1.—*Daily precipitation for February, 1917.*

Stations.	Watersheds.	Day of month.																											
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Dahlonega, Ga	Chattahoochee	1.89	....	....	T.	0.05	....	....	0.04	0.02	....	....	....	....	....	0.64	T.	0.68	0.83	1.51	0.14	....	....	T.	1.71	....	T.	....	....
Gainesville, Ga	do	1.70	....	....	....	.10	....	....	....	....	....	0.05	....	....	....	.80	....	....	.85	.98	2.05	.25	....	....	2.10	....	....	....	....
Norcross, Ga	do	1.32	....	0.01	....	.04	....	....	.01	.04	0.02	....	0.04	....	0.60	....	....	....	.82	.46	2.08	.26	....	....	1.30	....	....	....	....
Canton, Ga	do	1.89	....	T.	....	T.	....	....	T.	T.	T.	T.	T.	....	....	.81	....	....	.59	....	1.60	2.50	T.	T.	2.06	....	....	....	....
Lost Mountain, Ga	do	0.98	....	....	....	.05	....	....	....	....	....	....	....	....	....	.14	....	....	.68	1.00	....	....	....	1.55	....	....	....	....	....
Atlanta, Ga	do	0.88	T.	T.	....	.10	....	....	T.	.13	T.	T.	.01	....	T.	.51	....	T.	.80	.86	1.57	.17	....	T.	.83	....	....	....	....
Newnan, Ga	do	0.70	T.	....	T.	....	....	....	....	.03	....	....	....	....	....	.04	....	....	.75	.45	1.88	.34	....	T.	.33	T.	....	....	.06
West Point, Ga	do	0.62	....	....	....	.01	....	....	.11	.08	....	....	.10	....	....	.25	....	....	1.28	.29	1.18	.03	....	.02	.19	....	....	....	.02
Mean		1.25	T.	T.	T.	.04	....	....	.02	.04	T.	.01	.02	....	T.	.47	T.	T.	.81	.81	1.60	.14	....	.20	1.06	T.	T.	....	.01
River stages (feet) at West Point.		5.3	7.3	8.4	7.3	5.4	5.0	4.7	4.7	4.7	4.5	4.7	4.3	4.0	4.3	4.3	4.5	4.5	5.0	5.9	9.7	12.7	13.5	13.2	8.6	9.8	12.6	10.8	6.2

Example No. 1.—Feb. 1–3, 1917, rise 3.1 feet, rainfall 1.2 inch, factor 2.5 feet for each inch of rain. Modifying conditions: Heaviest rainfall in upper watershed.
Example No. 2.—Feb. 17–22, 1917, rise 9.0 feet, rainfall 3.36 inches, factor 2.7 feet.
Example No. 3.—Feb. 24–26, 1917, rise 4.0 feet, rainfall 1.26 inch, factor 3.2 feet. Modifying conditions: Rainfall in upper watershed, preceding heavy rains, high initial stages.

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